

Archer

Transduction by Pl of gal and Lp regions from heterogenotic donors.

Joint transduction of gal region and site of λ prophage attachment by phage Pl is found approximately as frequent as transduction for gal alone or Lp alone. The same proportions are found for $(\lambda)^-$ and $(\lambda)^+$ donors; heteroplasmic induction does not seem to influence much either the rate of transduction or the relative proportion of joint and simple transduction, although it is known that heteroplasmic induction is the normal response on transfer of λ prophage (2×10^{-4} per active Pl) and transduction by integration is rather exceptional (10^{-5} to 10^{-7}). Furthermore transductants from lysates obtained on λ doubly lysogenic donors are usually singly lysogenic for one particular prophage genome.

It was attempted to use Pl transduction to explore the site of fixation of λ dg on the bacterial chromosome; it may be assumed to be either Lp or gal in considering only the two simplest hypothesis. In marking endogenote and exogenote adequately it should be possible to distinguish the two alternatives;

e. g.	donor	acceptor	gal ⁺ transductants expected to be						
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a ⁻	b ⁺								
a ⁺	b ⁻								
a ⁻	b ⁻								
		some λ-sens, but more def lys							
		all def lys							
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a ⁻	b ⁺								
a ⁺	b ⁻								
a ⁻	b ⁻								
		about 1/2 λ-sens, 1/2 def lys							
		about 1/2 λ-sens, 1/2 def lys							
	etc								

but if λ dg is fixed on gal region: then transductants should always be



def lys, except the ones originating from Pl having been

multiplied on gal⁺, λ -sens segregant.

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In all experiments carried out with several donor and several acceptor strains λ -sensitive transductants are found, although at variable rates for different acceptors. But the analysis of the results - although being not in favor of the hypothesis that λ dg is fixed on the gal region- does not permit clearcut interpretations for several reasons: frequent recombination between homologous regions, apparently especially in the process of integration of the exogenote into the chromosome; segregants present in the donor culture; rate of transferred exogenotes which do lead to stable transduction is relatively low, and it is not known if this event is selecting some particular exogenotes.

Some experimental data:

assumed donor	acceptor	frequency of gal ⁺ transductants per active Pl	λ lysogeny test sens / def lys
1 ⁻ 2 ⁻ /ex gal ⁺ - λ dg	1 ⁻ 2 ⁻	2×10^{-6}	sens present
1 ⁺ 2 ⁻ /ex 1 ⁻ 2 ⁺ - λ dg	1 ⁻	10^{-7}	5 / 15
	2 ⁻	$1,2 \times 10^{-7}$	0 / 20
	1 ⁻ 2 ⁻	10^{-7}	8 / 12
1 ⁺ 2 ⁻ /ex 1 ⁻ 2 ⁺ - λ dg	1 ⁻	7×10^{-8}	10 / 23
	2 ⁻	5×10^{-8}	12 / 16
	1 ⁻ 2 ⁻	10^{-8}	2 / 10
1 ⁻ 2 ⁺ /ex 1 ⁺ 2 ⁻ - λ dg	1 ⁻	5×10^{-8}	2 / 8
	2 ⁻	$1,5 \times 10^{-7}$	0 / 20
	1 ⁻ 2 ⁻	3×10^{-8}	3 / 7